

SOCIAL SCIENCE

VISION AND STRATEGY



SUPPORTING NOAA'S MISSION WITH SOCIAL SCIENCE



ABOUT THIS DOCUMENT

This *Vision and Strategy: Supporting NOAA's Mission with Social Science* was created to support the National Oceanic and Atmospheric Administration (NOAA) in meeting its mission and advancing its priorities through the more effective use of social science, as well as to coordinate and institutionalize social science efforts in, and across, each of the line offices. This document focuses on a limited number of goals and objectives that will help to achieve these ends.

The *Vision and Strategy* is intended to remain a living document, and should be updated every 3-5 years, or as needed.

ACKNOWLEDGEMENTS

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Cover: Diamondhead at sunrise, Oahu, Hawaii, New Year's Day, 2011.

Photo: Lieutenant Commander Matthew Wingate, NOAA Corps.



Our Vision

NOAA's mission and priorities more effectively drive positive environmental, societal, and economic change.



NOAA Ship BELL SHIMADA on Seattle waterfront prior to commissioning ceremony. Photo: NOAA.

Our Strategy

Integrate Social, Behavioral, and Economic science end-to-end in NOAA's mission and priorities.



Marina. Photo: NOAA.

INTRODUCTION

NOAA provides the science, service, and stewardship that citizens need to react to and plan for the changing environment around them. To help achieve its mission, NOAA must bring forth the best natural science work fully integrated with the social, behavioral, and economic sciences in order to affect meaningful change.

In 2003 and again in 2009, the NOAA Science Advisory Board (SAB) found that the representation and utilization of social science in the agency were insufficient, and that social sciences continued to be underrepresented across research, operations, and decision-making. In June of 2013 an internal evaluation was released addressing NOAA's social science capability and needs, which was then followed by the establishment of the Social Science Tiger Team by Administrator Sullivan in April 2014 to begin to fill these gaps. All of this is to illustrate the increased attention that social science is receiving agency wide.

There is now wide-spread acknowledgment that an understanding of the social and economic elements of NOAA's work is crucial to effectively carrying out its mission. However, challenges remain and the agency has needed a corporate vision of the goals and aspirations for social, behavioral, and economic sciences that would help meet NOAA priorities more effectively.

To meet this need, the Social Science Committee has developed the: ***Vision and Strategy: Supporting NOAA's Mission with Social Science.***

This *Vision and Strategy* is being offered as an agency-wide product. The document provides opportunities to align office and program efforts with the goals, objectives, and strategies outlined within. Utilizing the full breadth of what the social sciences have to offer will increase the impact of NOAA investments and improve the creation and communication of societal value. It is important to note that not every office or program has equity or responsibility in every goal or objective. While this is a cross-agency *Vision and Strategy* for social science, the programs and offices will execute their resources in a way that supports their needs while looking for opportunities to work across NOAA, as detailed in the line office descriptions found herein.

The need for social science has and will always exist at NOAA. This *Vision and Strategy* is an important step on the path to focus the agency's efforts toward a more effective integration and application of social science that will help NOAA better serve society and help build a more resilient, stronger, and viable future for our Nation.



Dr. David Yoskowitz
NOAA Chief Economist
Chair, Social Science Committee

VISION

NOAA's mission and priorities more effectively drive positive environmental, societal, and economic change.

STRATEGY

Integrate Social, Behavioral, and Economic science end-to-end in NOAA's mission and priorities.

Make communities more resilient

Evolve the Weather Service

Invest in observational infrastructure

Achieve organizational excellence

GOAL 1

NOAA's impact on society is defined and measured.

GOAL 2

NOAA's products and services strengthen societal decision-making.

GOAL 3

Institutionalize social science to further NOAA's mission.

Quantify and promote the value and impact of NOAA's products and services in serving communities and meeting its mandates.

Standardize approaches for defining and measuring high profile economic data.

Strengthen the impact of investment by valuing improvements in NOAA products and services.

Incorporate social science research in management decisions to increase community resilience.

Use social science methods to assess and communicate risk while reducing vulnerability to changing environmental conditions.

Consistently collect social science data and information to strengthen the implementation of ecosystem-based management.

Integrate social science in program planning and budgeting.

Apply social science methods in internal agency operations and decision-making.

Use only the most high-quality, robust, and innovative social science in NOAA products and services.

Science, Service, and Stewardship



GOAL 1

NOAA's impact on society is defined and measured.

- **Quantify** and promote the value and impact of NOAA's products and services in serving communities and meeting its mandates.
 - Identify key products and services that need to be valued to more effectively deliver on NOAA's priorities.
 - Use value chain models to demonstrate how key NOAA products and services advance community resilience.
 - Improve the discoverability, accessibility, usability and re-purposing of NOAA products and services through enhanced communications.
- **Standardize** approaches for defining and measuring high profile economic data.
 - Provide accuracy and address biases in the methodology used in developing the disaster loss assessments.
 - Develop and implement a strategic approach for valuing NOAA's products and services that will generate comparable and scientifically defensible estimates.
- **Strengthen** the impact of investment by valuing improvements in NOAA products and services.
 - Develop guidance needed to understand the value of marginal improvements.
 - Conduct tradeoff analyses of management decisions.

GOAL 2

NOAA's products and services strengthen societal decision-making.

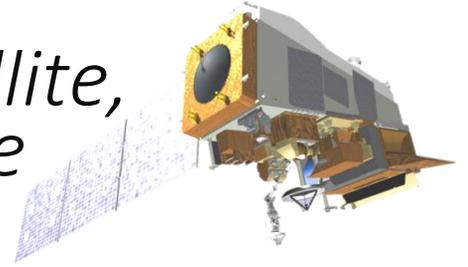
- **Incorporate** social science research in management decisions to increase community resilience.
 - Develop metrics, performance measures, and benchmarks that demonstrate improved societal outcomes.
 - Apply research results to fisheries management decisions to enhance resilience of coastal communities.
 - Estimate and apply ecosystem services valuation to demonstrate connections between ecological well-being and community well-being.
- **Use** social science methods to assess and communicate risk while reducing vulnerability to changing environmental conditions.
 - Improve decision-support tools for communities.
 - Use innovative communication approaches to deliver more effective warnings.
- **Consistently collect** social science data and information to strengthen the implementation of ecosystem-based management.
 - Identify and inventory socio-economic data gaps.
 - Establish partnerships to improve access to sources of socio-economic data.
 - Integrate socio-economic data to ecosystem-based management (models and practices) and other decision-making tools.

GOAL 3

Institutionalize social science to further NOAA's mission.

- **Integrate** social science in program planning and budgeting.
 - Create incentives and accountability for incorporating social science in planning and budget.
 - Integrate impact of investment analyses into FFOs and internal research processes.
- **Apply** social science methods in internal agency operations and decision-making.
 - Foster awareness and commitment to use social science by developing social science training modules.
 - Build support for NOAA social science by engaging emerging NOAA leadership.
 - Leverage social science capacity across NOAA's external partners.
- **Use** only the most high-quality, robust, and innovative social science in NOAA products and services.
 - Apply scientific integrity principles in the practice of social science at NOAA.
 - Attract and retain targeted social science expertise.
 - Evaluate a select suite of products and services to confirm the integration and effective use of social science.

National Environmental Satellite, Data, and Information Service (NESDIS)

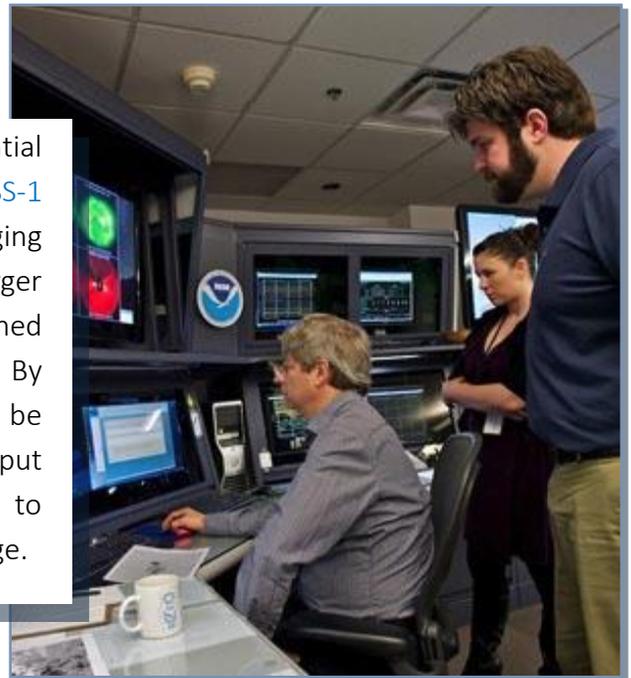


To be the world's most comprehensive source and recognized authority for satellite products, environmental information, and official assessments of the environment in support of societal and economic decisions.



NESDIS is dedicated to providing timely access to global environmental data from satellites and other sources to promote, protect, and enhance the Nation's economy, security, environment, and quality of life. Social science tools help transition information to actionable products that are used by our constituents.

NOAA's space-based observation platforms provide essential data across NOAA's mission areas. [GOES-R and JPSS-1 satellites](#) will launch in 2016 and 2017, each bringing increased capabilities through new data sets and larger amounts of information, as does the recently launched [DSCOVR](#) with its solar wind monitoring capabilities. By ensuring that our customers understand what data will be available, are trained to use it most effectively, and have input into methods of data utilization, NESDIS is committed to having the highest impact to end-users and society writ large.



Forecasters at NOAA's Space Weather Prediction Center. Photo: NOAA.

GOAL 1

NOAA's impact on society is defined and measured.

Quantify and promote the value and impact of NOAA's products and services in serving communities and meeting NOAA mandates.

Over fifty years ago the United States began its weather satellite program. NOAA is a steward of this program that continues to provide data and observations necessary for the protection of life and property. It is important that the public benefit of these programs be quantified in a way that illustrates the value for the investment. In order to accomplish this, NOAA is committed to being able to value the benefits of these systems.

Over the past decade, NESDIS has made attempts to value its satellite systems for this purpose with limited success. Therefore, NESDIS is *supporting a valuation economist to begin the process of deriving value based on specific criteria, including quantifying the value of NOAA's satellites for economic sectors such as commercial shipping, aviation, and insurance, among many more.*

Strengthen the impact of investment by valuing improvements in NOAA products and services.

In concert with NWS, the GOES-R and JPSS programs are implementing Satellite Proving Grounds. These programs *facilitate the transition of GOES-R and JPSS into operations, support demonstration and utilization of new capabilities by end users, and incorporate user feedback for product improvements.* Through the Proving Grounds, NESDIS and NWS are working to ensure GOES-R and JPSS data are incorporated into numerical models as quickly as possible. The Proving Grounds also work hand in hand with NWS forecasters to train these primary users in the specific capabilities of GOES-R and JPSS.

NESDIS is also engaged with users outside NWS through the NOAA Satellite Conference held every two years. The conference brings together users of NOAA satellite data from around the world to help them understand the capabilities of GOES-R and JPSS and to facilitate their readiness to use these capabilities.

In addition to NOAA satellites, data from NASA research satellites are regularly incorporated into NOAA forecast models and other products. Through the NASA Soil Moisture Active Passive (SMAP) mission Early Adopters program, NOAA provided feedback on mission products before the SMAP launch, and is working with NASA to accelerate the operational use of mission products now that the satellite is on orbit. NOAA will engage NASA similarly on other missions. This work leads to improved products for operational users, leveraging work being done outside of NOAA for maximum impact of taxpayer investment.

GOAL 1

NOAA's impact on society is defined and measured.

Standardize approaches for defining and measuring high profile economic data.

NESDIS' National Centers for Environmental Information (NCEI) produces Billion Dollar Weather and Climate Disasters data, one of the most often cited estimates of the economic losses associated with extreme weather and climate events produced by NOAA. *Our nation's resilience to weather and climate events depends on an accurate understanding of their economic consequences. Loss estimates are frequently cited by policy-makers and by the news media—their accuracy is critical.*

NESDIS will incorporate social science to improve the accuracy and consistency of disaster loss estimates by refining existing methods; expanding the scope of estimates to include non-market losses, human health, and other values; developing NOAA-wide standards and coordination; and improving the accessibility and usability of our products.

GOAL 3

Institutionalize Social Science to further NOAA's mission.

Apply social science methods to enhance internal agency operations and decision-making.

NOAA's satellite systems currently in operation and development will operate into the coming decades. NESDIS has begun the process of defining the architecture of NOAA's next generation space-based observations portfolio that will follow these systems and provide the space-based data needed to meet NOAA's mission needs into the 2040s and beyond. End-to-end studies will be conducted that will prioritize increased flexibility, increased responsiveness to evolving technologies, and increased budget stability. A NOAA *requirements working group will engage users to define needs and subsequently establish a prioritized list of NOAA space-based observational needs into the next generation era.*

In conducting this key first step of the architecture studies, NESDIS will ensure that user needs form the foundation of and are prioritized throughout the subsequent architecture studies and decisions. NESDIS is also developing an "enterprise ground system" that will provide the command and control for all NOAA satellites; ingest, process, distribute and archive data from these satellites; and maintain the algorithms that convert this data into useful products. The enterprise ground system will provide users of NOAA satellite data one interface for accessing all data sets and products. This consolidated interface with users will accelerate product development and service deployment. A primary goal of the NESDIS enterprise ground system is to create a more efficient and effective method for users to access data from NOAA and our partners, along with the products derived from these data.



National Marine Fisheries Service (NMFS)

Science in support of sustainable marine ecosystems and resilient communities.



Walter Coghlan, Acting Chief Steward on the NOAA research ship Oregon II. Photo: Rich Press/NOAA



At the seafood counter. Photo: NOAA.

Fisheries management involves complex trade-offs in a changing environment. [NMFS](#) decision support tools and data enable the agency to produce timely assessments to identify management options that achieve the greatest net benefit to the nation.

[NMFS provides end-to-end social science integration in NOAA products and services.](#) For example, in 2010, the NOAA catch shares policy was released to encourage the use of programs to maintain or rebuild fisheries while sustaining fishermen, communities, and vibrant waterfronts. In 2012, the NMFS Economics Program further initiated an effort to track the performance of these programs. The initial report showed programs were successful in having fishermen observe annual catch limits, improving overall economic benefits and efficiency, and ending the race to fish. Catch share programs have also been effective in reducing the pressure on fishermen to fish during unsafe conditions and have also resulted in a reduction of fishing capacity. Indicators for assessing the distributional effects of catch share programs as well as productivity were implemented in 2013 and 2014, respectively. NMFS initiative to assess the economic performance of catch share programs enables managers to track progress on program objectives and also fulfills an Agency OMB reporting requirement to monitor the performance of such programs. Additional economic and community resiliency metrics for catch share programs are currently underway. In addition, NOAA Fisheries plans to expand these metrics to a wide range of non-catch share fisheries in the out-years.



First Salmon Ceremony, Lummi Nation, 2009. Photo: Gary Simms, NOAA.

GOAL 1

NOAA's impact on society is defined and measured.

Quantify and promote the value and impact of NOAA's products and services in serving communities and meeting its mandates.

NMFS is supporting an effort to investigate the Economic Impacts of Federal Ocean Science & Technology Investments. Initiated in spring 2015, NMFS and NOAA's Office of Program Planning & Integration will lead an interagency effort to assess the economic impacts of federal ocean science and technology investments. The second phase of this interagency effort will assess the economic benefits from selected case studies of ocean science and technology investments. The intent of this project is to demonstrate that S&T investments are an engine for growth both nationally and in coastal communities and not just an academic or research endeavor.



In support of Ecosystem Service Valuation, NMFS led an effort to assess the costs and benefits as well as the economic impacts associated with the proposed action to remove the Klamath River Dam. This effort provided an in-depth analysis of the potential trade-offs and distributional effects of the proposed dam removal. The assessment was massive in scope because of the major sectors involved (agriculture and hydropower), the diversity of fisheries (commercial, recreational, tribal fisheries), other recreational activities (kayaking, hunting, bird watching, boating on the reservoir), and the non-use values accruing to the public from the habitat restoration activities. Without the non-use values, net benefits favored keeping the dam; inclusion of the non-use values resulted in net benefits favoring dam removal. This study laid the groundwork for current and upcoming economic analyses that consider habitat restoration benefits.

Strengthen the impact of investment by valuing improvements in NOAA products and services.

NMFS also is, and will continue to, investigate the economic value of scientific information. Because the risk of being wrong could result in extinction, protected species management must be risk averse. Thus, scientific information with a high degree of uncertainty results in stricter management measures. We know that the more data we collect, the more precise our estimate will be, and the more confident we can be in setting regulations that balance fishing activity and species protection. A recent NMFS study found that a modest annual increase of \$217,000 for data collection could improve the precision of Northwest Atlantic harbor porpoise stock assessment such that profits to commercial fishermen would increase by \$850,000 per year, as fishermen will be able to catch more commercial stock that would otherwise have gear interactions with porpoises. The benefits from additional stock assessment survey more than outweigh the cost of the survey.

GOAL 2

NOAA's products and services strengthen societal decision-making.

Incorporate social science research in management decisions to increase community resilience.

NMFS and partners have developed the Spatial Economics Toolbox (FishSET) to improve information provided to managers of the economic tradeoffs among different uses of marine resources. FishSET provides data management tools, model and model validation tools, and policy simulation tools. In Alaska, FishSET has been used to assess the impacts of closed areas, catch shares, climate change, and bycatch avoidance on commercial fisheries. In the Southeast, a pilot application in the Gulf of Mexico grouper fishery will assess the effects of the grouper tilefish catch share program. Additional applications of FishSET could include analysis of losses from fishing ground closures due to regulations, ocean energy sittings and oil spills.

Use social science methods to assess and communicate risk while reducing vulnerability to changing environmental conditions.

In 2014, NOAA Fisheries released a web-based mapping tool that allows managers and other stakeholders to assess the social vulnerability and resilience of over 2,900 coastal communities from Maine to Texas of which one third are involved in either commercial and/or recreational fishing activity. Thirteen indicators of social vulnerability, gentrification pressure, and fishing engagement and reliance were included. The indicators represent the first set of quantitative, statistically robust measures at the community level that can add depth to social impact assessments of proposed fishery management actions. In 2015, the Toolbox will be expanded to include the West Coast, Alaska and Hawai'i. In addition, the tool will also map sea level rise risk. An outyear goal is to adapt these measures so that they can be used to assess community impacts from changes in distribution or landings of climate vulnerable species.

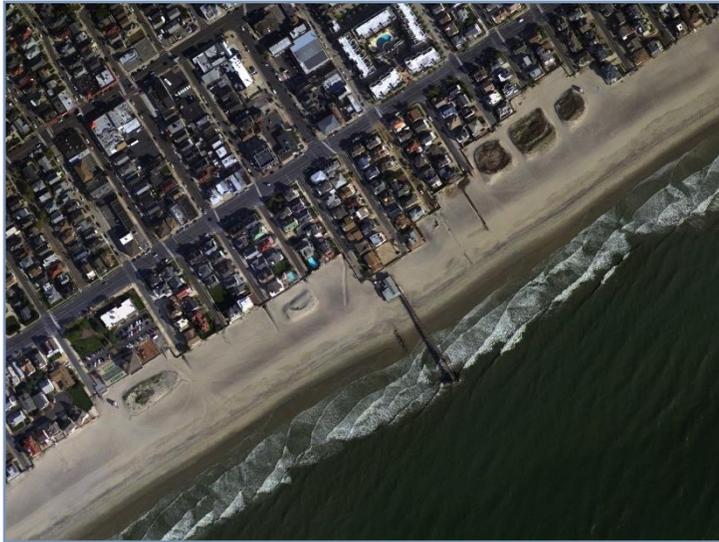
Consistently collect social science data and information to strengthen the implementation of ecosystem-based management.

The Bioeconomic Length-structured Angler Simulation Tool (BLAST) is a fully integrated and dynamic decision support tool for assessing the benefits associated with common recreational fishing management actions including changes in bag limits, season length, and re-building plans. This ecosystem approach to fisheries management provides insight into the short- and long-run effects of alternative policy options on both the economic and environmental health of recreational fisheries. Lauded by recreational fishing stakeholders for the transparency it brings to management decision-making, BLAST improves assessment quality while enabling economists to assess a greater number of management options in a fraction of the time. First implemented in the Northeast and approved for use by the Mid-Atlantic and New England Fishery Management Councils, new BLAST applications are planned for the Gulf of Mexico and the West Coast.

National Ocean Service (NOS)



Supporting coastal communities, promoting a robust economy, and protecting coastal and marine ecosystems.



Margate City, New Jersey. Photo: NOAA.

NOS supports coastal communities, promotes a robust economy and protects coastal and marine ecosystems. To accomplish this goal, NOS issued its Roadmap in May 2014 as a guide for directing its programs for the next three to five years, focusing on three strategic directions to bolster the Nation’s coastal resilience, coastal intelligence, and place-based conservation. Social science is a common theme in these areas.

NOS strengthens coastal intelligence across the nation by providing actionable information needed by decision-makers to reduce risk along coastal zones. NOS’ data tools and streams are accessed by a wide range of users from mariners to public health authorities. Social science methodologies improve the communication of this information so that decision-makers and the public can better understand and evaluate risk. NOS uses social science methodologies to define and measure the economic benefits of its programs to the Nation, to understand the value of NOS special places and trust resources to the public, to build decision-making capacity in coastal communities, and to determine the impacts of coastal resource management activities on local communities and economies.



Sand grass at Long Beach Peninsula, Washington. Photo: NOAA Fisheries.

GOAL 1

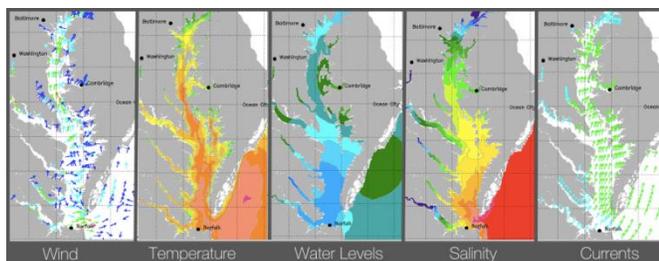
NOAA's impact on society is defined and measured.

Quantify and promote the value and impact of NOAA's products and services in serving communities and meeting its mandates.

One example of NOS valuation efforts is the *Physical Oceanographic Real-Time System (PORTS®)*, an integrated system of sensors that provides real-time environmental conditions used by mariners to avoid collisions and groundings. Serving 175 major U.S. seaports, PORTS® spare the Nation over \$16 million annually in damages, avoiding hundreds of injuries and deaths. Additional areas providing significant economic benefits include NOS' Geodesy program and its National Spatial Reference System (\$2.4 billion in potential annual benefits), NOS' Continuously Operating Reference Station network (\$758 million annually) and the Gravity for the Re-Definition of the American Vertical Datum initiative (\$522 million annually) with approximately \$240 million saved from improved floodplain management alone. Moving forward, NOS will *further engage its coastal partners to measure the value of these programs and communicate their benefits to the Nation.*



These maps show typical hourly forecasts of different oceanographic conditions for Chesapeake Bay. Similar hourly spatial animations for the next 48 hours are available [online](#) for other locations and are updated every six hours.



GOAL 2

NOAA's products and services strengthen societal decision-making.

Incorporate social science research in management decisions to increase community resilience.

NOS findings from ecosystem service valuation research are used by coastal managers and other decision-makers to improve management and restoration, damage assessment, policy development, and regulatory interventions. Looking forward, NOS foresees applying resources in physical and social sciences to help coastal planners integrate ecosystem-based solutions into hazard mitigation, resilient coastal development, and post-event rebuilding decisions. Activities will include *economic valuation of ecosystem services, natural resource characterizations, and decision support products that depict long-term benefits and tradeoffs of natural vs. built infrastructure.*

Use social science methods to assess and communicate risk while reducing vulnerability to changing environmental conditions.

NOS' *Inundation Network*, a system of landmarks surveyed to a single reference, enables effective communication of coastal inundation risks. Another valuable tool is the Rip Current Probabilistic Forecast Model being piloted in collaboration with government and private partners in Hampton Roads, Virginia. Working together with the National Weather Service, NOS is incorporating new rip current model output into beach hazard forecasting and communication to keep beachgoers safe. Finally, NOS relies upon social science research findings to *inform communication and outreach efforts related to ecological forecasts around the country.*

NOA

In promoting *coastal resilience*, NOS further engages with key partners to improve community understanding, and consideration of adaptation to coastal hazards and climate risk, vulnerabilities and potential impacts, including efforts to develop standards for and indicators of community resilience. For example, NOS is helping coastal communities to better understand their vulnerability to natural hazards in the Chesapeake Bay region so that they can plan and prepare. *This research will continue to integrate socio-economic and ecological data for a range of decision-support applications.* NOS also engages communities to enhance their capacity to understand and effectively communicate and address risks associated with coastal hazards, improving the ease with which coastal communities use relevant information to make decisions about total water level and its impacts.

National Weather Service (NWS)



Our Nation's first line of defense against severe weather.



NOAA NWS provides weather, water and climate data, forecasts, and warnings for the protection of life and property and enhancement of the national economy. Social science tools help transition information to actionable products that are used by our constituents.

Fire Weather Briefing. Photo: U.S. Forest Service.

NWS' Weather-Ready Nation (WRN) initiative builds community resilience in the face of increased vulnerability and risk to weather-related events. The traditional NWS model has relied on providing accurate and timely forecast information to core partners. With the help of social science tools and approaches, WRN transforms and extends that model.



Hurricane Ike Storm Surge, 2008. Photo: NOAA.

GOAL 2

NOAA's products and services strengthen societal decision-making.

Incorporate social science research in management decisions to increase community resilience.

At the heart of WRN are *Impact-Based Decision Support Services (IDSS)*. IDSS ensures that accurate, consistent, and high-quality forecasts are effectively communicated to core partners. As a result, information can be used by emergency managers and the public to make good and timely decisions.

One of the key aspects of the WRN initiative is to affect societal outcomes. *NWS is undertaking work to develop performance metrics for tracking societal outcomes from the WRN initiative*, including metrics that explore the relationship/link between forecasts and people/entities being better informed, better prepared, and taking action to avoid death and injury, which reduces costs to individuals and businesses and improves economic efficiency.

Use social science methods to assess and communicate risk while reducing vulnerability to changing environmental conditions.

Stakeholder outreach has found that many members of the public fail to understand weather and water hazard messaging, including some terms that are frequently used by emergency managers and communicators. Our constituents also lack comprehension of the true impact of extreme events, resulting in inadequate responses.

In collaboration with social and behavioral scientists, *NWS is assessing the strengths and weaknesses of its current Warning, Watch, and Advisory (WWA) system*. The assessment enhances the clarity of WWA products to prompt adequate public response, improves the understanding, attitudes, and utility of the current system, identifies its strengths and limitations, and explores possible prototypes as a way to compare the current WWA and weather.gov features.



Following the Southeast U.S. Tornado Outbreak of 2011, NWS developed the *impact-based warning (IBW)* product, designed to support the decision-making needs of NWS partners, and especially emergency managers and broadcast media. The IBW product is an enhancement of the severe weather and tornado warning message intended to convey a sense of urgency on the potential impact of storms. Using social science methods and expertise, *NWS is developing improved products and information that will increase the likelihood that the public will take appropriate action to protect their life and property when faced with a tornado or severe thunderstorm.*

GOAL 3

Institutionalize Social Science to further NOAA's mission.

Integrate social science in program planning and budgeting.

NWS has recently undergone structural reorganization, and social science is now part of the Office of Science and Technology Integration (STI) Portfolio. STI performs portfolio management for planning, research and development, as well as integration efforts for science and technology improvements across NWS.

The Portfolio is charged with overseeing major research and development areas, establishing priorities, and providing centralized coordination for the development of decision support tools and social science integration. Of additional importance is STI's role in coordinating with regional NWS offices and NOAA line offices, as well as the research community. NWS social science efforts are now better placed to be less ad hoc and more coordinated and integrated within NWS and across NOAA.



Photo: NOAA.

In 2013, extreme events in the U.S. cost nearly \$ 24 billion in economic and infrastructure losses.

Source: <https://www.ncdc.noaa.gov/billions/>

Oceanic and Atmospheric Research (OAR)



Be a trusted world leader in observing, modeling, understanding, and predicting the Earth system.

OAR creates improved understanding and predictions of the Earth system by leading research and technology development, by supporting the transference of products and information, and by forging partnerships among academic, private, and governmental organizations. Social science is essential to achieving OAR's vision.



NOAA Open House at Seattle Science Festival. Photo: NOAA



Boat owner surveys. Photo: NOAA.

OAR's research spans the human and physical traditions, enhancing societal decision-making across scales from local to international. OAR's research enhances our understanding of the populations served by NOAA, and enables NOAA scientists to identify and communicate trends in risk and vulnerability as environmental conditions change. OAR's work also supports interagency activities and provides an important link between a number of key scientific organizations, other Federal organizations, international governing bodies, NGOs, and NOAA operations.

GOAL 2

NOAA's products and services strengthen societal decision-making.

Incorporate social science research in management decisions to increase community resilience.

Within the Climate Program Office, a suite of programs provides leadership and support for research, assessments, and services development activities to bring sound, interdisciplinary science to climate sensitive resource management and adaptation challenges in key areas. For example, the university-based Regional Integrated Sciences and Assessments (RISA) program supports social scientists to conduct analyses that help frame the science agenda of the teams, *understand decision contexts of stakeholders, determine community vulnerability, and improve the science communication to decision-makers.*

Use social science methods to assess and communicate risk while reducing vulnerability to changing environmental conditions.

Numerous weather disasters in recent years, including the severe tornado events of 2011 and post-tropical cyclone Sandy in 2012, inspired OAR to pursue research to *improve weather risk communication products and practices.* This research includes studies of communication challenges and opportunities presented by social media, the potential to communicate uncertainty information in warnings, potential improvements to flash flood and storm surge products, and ways to improve communication with a variety of populations and stakeholder groups. The results of this research will help OAR to launch a new process for innovating and bringing research into operations.



The National Integrated Drought Information System (NIDIS) provides the leadership and networks needed to implement an integrated drought monitoring and forecasting system while creating a research environment focusing on risk assessment, forecasting, and management. NIDIS also funds the Coping with Drought (CWD) initiative with multidisciplinary teams of investigators who are well suited for addressing the complex problems of competing water-resource allocation issues critical for decision making by impacted communities. This funding will continue to *integrate social with natural and/or physical science components to form a more comprehensive analysis of the dynamics of climate-human-natural interactions.*



NOAA, in conjunction with other Federal agencies and in response to the President's Climate Action Plan, launched the Climate Resilience Toolkit, which will help decision makers across the U.S. prepare for climate and weather-related changes and impacts. The toolkit provides scientific tools, information, and expertise to help people manage climate-related risk and strengthen their resilience. OAR will continue to use social science to enhance the utility of the toolkit.

GOAL 3

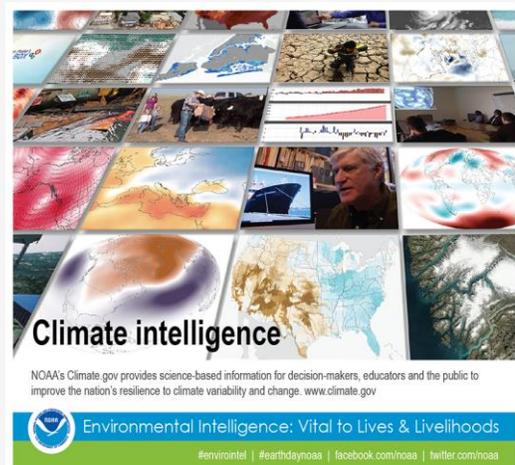
Institutionalize Social Science to further NOAA's mission.

Apply social science methods in internal agency operations and decision-making.

OAR will lead a series of NOAA-wide webinars to build social science understanding and capacity within the agency. *The webinars will highlight the integration of human-oriented studies to agency functions, both within and outside of NOAA; highlight research findings of broad interest; and include professional development opportunities to keep applied researchers current.* By sharing current social science research and successes across NOAA, these webinars will help to increase awareness of the value of social science at NOAA and provide concrete examples of how it is used to inform the public, as well as NOAA's products, services, and information. The first webinar will be held in early Fall 2015.

Integrate social science in program planning and budgeting.

OAR laboratories and programs increasingly include social and behavioral science in their calls for proposals, strategically building relationships with those research communities and *increasing the institutionalization of human-oriented approaches within the broader portfolio of NOAA research.* One example is work on Forecasting a Continuum of Environmental Threats (FACETS). This National Severe Storms Laboratory program is intended to expand forecasting technologies alongside advancements in warning dissemination systems, weather risk communication and decision sciences to enhance U.S. resiliency to severe weather. Another of these investments is the Sea Grant National Social Science Initiative & Resilient Coastal Communities. Sea Grant has provided funding incentives for its state programs, resulting in a strong social and behavioral science integration within their research and outreach projects. They continue to foster these connections at local levels with competitions that encourage multidisciplinary approaches in areas such as Resilient Coastal Communities.



Office of Marine Aviation and Operations (OMAO)



To be the Nation's trusted leader for innovative, adaptive, and reliable oceanic and atmospheric observation platforms.



NOAA's fleet, managed and operated by **OMAO**, plays a critical role in the collection of oceanographic, atmospheric, hydrographic, and fisheries data. Social science helps us better understand and communicate the value of NOAA's fleet to the Nation.

NOAA aircrafts. Photo: OMAO, NOAA.



NOAA Ship. Photo: NOAA.

OMAO is committed to sustaining its observation portfolio and fleet. A recapitalization plan seeks to ensure that OMAO has the right fleet composition and capabilities to maximize high priority mission requirements, and that OMAO's fleet is relevant and versatile in the face of changing mission needs and advancing technology. OMAO is also committed to the development of a long-term strategy to incorporate integrated valuation and economic data, efficient asset life cycle management, and performance measurement. Social science tools help OMAO link the societal value of ship and aircraft observations to NOAA line office products and services, and to better communicate the value of NOAA to society.



NOAA Ship Hi'ialakai's. Photos: BGL P. Langlois, NOAA.

GOAL 1

NOAA's impact on society is defined and measured.

Standardize approaches for defining and measuring high profile economic data.

NOSIA II (NOAA Observing Systems Integrated Analysis) is a standardized methodology developed by the Technology, Planning and Integration for Observations (TPIO) Office that OMAO is refining to better assess the value of NOAA's observations and observing systems. This effort to understand and quantify the [linkages between observation infrastructure and NOAA products and services](#) aims to determine the impact OMAO's observing systems have on NOAA's mission critical requirements. Quantifying those linkages in the NOSIA methodology has already revealed a preliminary cost versus impact score, contributing to an overall assessment of observing system impact.

OMAO serves a primary mission support function and strives to improve performance on mission readiness and utilization, data delivery, and customer satisfaction in order to maximize our service delivery and benefit to NOAA and the public. OMAO's goal to incorporate [outcome based measures and societal impacts](#) into a decision tool such as NOSIA is part of the long-term strategy for integrated valuation and economic data.

OMAO will assess whether current assets can bridge the gap between planned and actual performance and, if not, identify the cost to mitigate that gap. Standardized methodology for costing observing systems across NOAA was recommended in a report from the U.S. Government Accountability Office entitled "NOAA's Observing Systems: Additional Steps Needed to Achieve an Integrated, Cost-Effective Portfolio". One of OMAO's strategic goals includes efficient asset life cycle management.

Strengthen the impact of investment by valuing improvements in NOAA products and services.

Recapitalization for both ships and aircraft incorporates the NOAA Observing Systems Council's (NOSC) approved [Program Observation Requirements Documents \(PORDS\)](#) as its foundation, which summarize program requirements and performance measure mapping. Building off of this work, an understanding of current and future scientific observation needs will be developed to inform the next generation of platform design and capabilities. This will ensure [smart investment planning and the highest level of customer satisfaction](#). To better understand how these needs can most effectively be met, key criteria also are needed to identify the value of marginal improvements across potential new capabilities.

OMAO will be developing these criteria, which may include validated and relevant observing priorities; linkages between agency mandates and strategic goals; leveraging multi-agency resources; performance measures focused on data delivery; and customer surveys and performance evaluations. A comprehensive understanding of the federal fleet, common priorities and resource and mission systems will provide maximum return on the taxpayer investment.

GOAL 3

Institutionalize Social Science to further NOAA's mission.

Integrate social science in program planning and budgeting.

OMAO contributed funds to hire a valuation economist, who, among other things, is designing a framework to link the societal value of ship and aircraft observations to NOAA Line Office products and services. OMAO is also progressing towards using outcome based performance measures in their newly formed Performance Management System. Using NOSIA methodology to identify linkages between OMAO and NOAA products and services combined with outcome-based performance measures will advance OMAO's understanding of societal impact. Looking into the future, the outcome of the [performance measures effort](#) will result in the incorporation of social science into the planning and budget of OMAO. Through enhanced understanding of the value of having a NOAA fleet, NOAA will be able to better respond to valuation questions posed by Congress, OMB, and other partners.



A NOAA Lockheed WP-3D Orion. Photo: NOAA.



LCDR Kristie Twining in the cockpit of a Twin Otter aircraft. Photos: NOAA.

VISION AND STRATEGY



Supporting NOAA's Mission with Social Science